



# The Business Advantages of an Emerging Industry-Standard Approach to Cluster Communications

A Strategic Briefing for IT Decision-Makers



## Moving Toward One Set of Solutions for Business Computing

Over the past decade, companies have been investing a growing percentage of their information technology (IT) dollars in Intel-architecture computing solutions. Today that investment is evident in the business assets that sit on users' desktops, as well as the systems that function as LAN workgroup servers, e-mail servers and Web servers.

The implications are clear: Client/server technology is rapidly becoming capable of handling the workloads that not long ago were the exclusive province of the data center. More important, the technology shows every sign of continuing to deliver increasingly greater performance at an ever lower cost.

In light of this trend, IT professionals have every reason to demand that the strides they have taken in the distributed systems environment could be leveraged for data center applications. Now, thanks to a new industry-wide communication architecture, they will.

## VI Architecture: Scaling Enterprise Applications to New Heights

The preliminary Virtual Interface (VI) Architecture specification defines an emerging high-speed cluster communication interface that promises substantial benefits for distributed enterprise computing. Specifically designed for low-latency, high-bandwidth message-passing in clusters of servers and workstations, VI Architecture defines interfaces for building affordable, high-performance scalable clusters based on Intel-architecture systems.

Clustering has helped shape many advances in enterprise-wide distributed computing in the 1990s. Many companies have adopted clustering technology for its ability to provide reliability and scalability for mission-critical applications such as data warehousing, decision support and transaction processing.

The VI Architecture specification, an industry initiative spearheaded by Intel Corp. in collaboration with Compaq Computer Corp. and Microsoft Corp., is expected to usher in a new era for enterprise applications. It will enable building clusters around the common building blocks of standard high-volume (SHV) servers and commercial, off-the-shelf operating systems. This new paradigm will deliver the enterprise-class

scalability, reliability, availability and manageability that businesses need for high-performance, mission-critical applications— at a fraction of the cost of traditional, proprietary main-frame and RISC-based clustering technologies.

Clusters based on Intel-architecture systems and the VI Architecture specification are open, flexible and highly scalable. Companies will be able to run their most complex enterprise-class applications on this clustering model, whose high availability, modularity and reliance on industry standards makes computing more affordable.

## Addressing Total Cost of Ownership (TCO) Issues

Today's computing environments are becoming more and more sophisticated, moving to distributed processing, very large files and databases, server consolidation and 7x24 uptime demands. In addition, with the Internet driving the globalization of business, companies of all sizes have come to rely on online access and presence to run their core business operations.

When it comes to minimizing the costs of business computing, the less heterogeneity, the better. VI Architecture, because it offers a consistent framework for high-performance, scalable clustering and a consistent interface, by its nature lessens network heterogeneity. It stands to reason that if IT managers don't have to train their people in multiple systems and various operating procedures, their costs will be less.

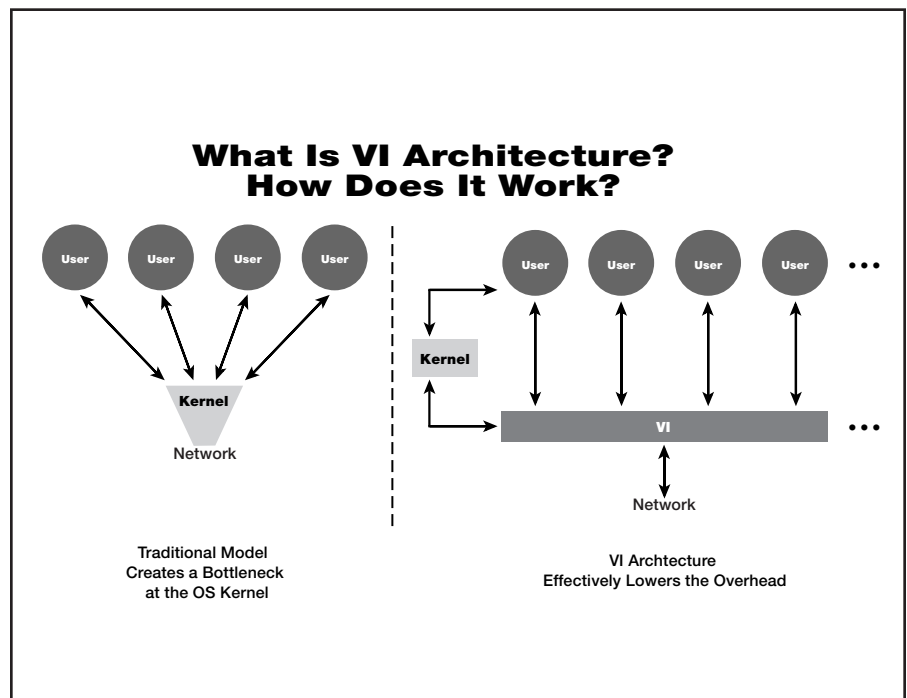
VI Architecture represents a revolutionary improvement over the traditional clustering model. The good news is all of this technology advancement comes without a high price tag. VI Architecture collaborators have taken well-established, proprietary concepts and technologies from the mainframe environment and applied them to an economic model that offers the inherent advantages of higher volume and lower unit cost.

The cost equation is thus dramatically changed, to the tune of at least one order of magnitude: The performance, capacity, headroom and scalability that a \$1 million mainframe offers is no greater than what an SHV server-based cluster can deliver, at an acquisition cost of less than \$100,000.

## Performance Issues: Honing a Competitive Edge

When it comes to succeeding in today's highly competitive business environment, savvy IT professionals know that every millisecond counts.

VI Architecture helps transform a collection of independent SHV servers into a highly scalable cluster that can meet the performance and capacity requirements of the largest and most demanding enterprise applications. Its fast server-to-server communications can enhance an application's scalability and performance in a variety of ways - from allowing a single application to run efficiently across dozens of clustered nodes, to speeding up the exchange of data between distributed application modules running on different application servers.



Eliminating the bottleneck of the OS kernel not only boosts communication performance but also increases the number of CPU cycles available for performing other work

In many cases, the gain in communication performance can be dramatic. For example, consider the way in which VI Architecture works to improve communication speeds in a distributed database. With VI Architecture in place, messages travel quickly between the database and its application servers, and the CPU is relieved of much of the software overhead ordinarily associated with messaging. As a result, the database, the application servers and the CPUs operate more efficiently. The database spends less time waiting for work, the application servers spend less time waiting for responses, and the CPUs have more cycles free for other work.

The bottom line for business? The IT department sees improved application performance and gets more mileage out of the same equipment.

## Enhancing Network Reliability

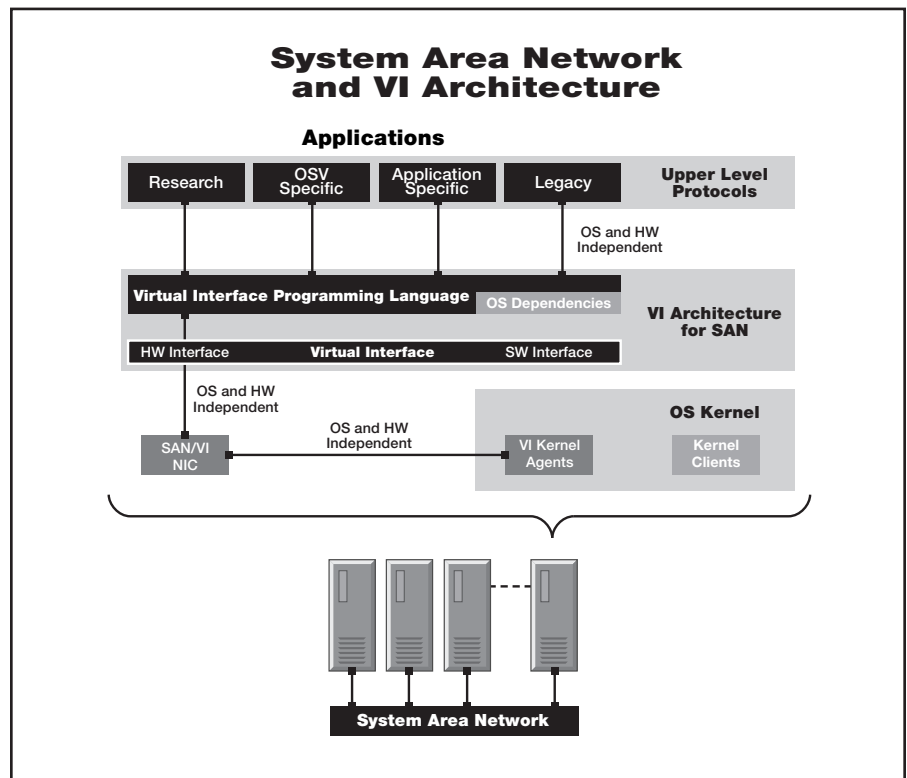
Reliability is a key area of concern as businesses trust their core, business-critical applications to clusters of SHV servers.

The VI Architecture specification takes a significant step toward defining the reliability of a system area network (SAN) - a network that connects the nodes within a single cluster. SANs are optimized to provide low-latency, high-bandwidth

communication within the cluster. Although systems within a cluster can be connected by means of standard LAN and WAN technology, a SAN is optimized to provide the lower latency and greater bandwidth required by high-performance server clusters and enterprise-class applications.

VI Architecture addresses the issue of network dependability by guaranteeing applications a consistent minimum level of reliability. The specification is also written in such a way that applications can choose higher degrees of reliability when the underlying interconnect supports it.

Thus, reliability levels can be expected to rise further as hardware vendors offer more sophisticated services in their VI-compliant products.



VI Architecture enables high speed communications between applications and System Area Networks, specialized networks optimized for low-latency, high bandwidth cluster communications.

## Incorporating the Benefits of VI in Your Computing Environment

Just as Intel has delivered more power at lower prices with each successive generation of micro-processors, VI Architecture promises to make high-performance clustering technology available at an order of magnitude less cost. By pulling clusters into the volume space, VI Architecture takes advantage of the cost savings, flexibility and versatility of the high-volume computing market segment.

The momentum gathering behind this proposed industry standard will spur rapid growth in third-party cluster solutions. This industry-embraced architecture will define how the hardware and software interfaces interact with each other, as well as with the applications. Software vendors can develop to a single interface, and hardware vendors can optimize to support low latency and high reliability.

The rationale for incorporating low-cost, high-performance, scalable clusters in today's business environment is clear: Companies that elect to follow the path of single-vendor, proprietary clustering solutions will find themselves constrained by that investment and unable to make the nimble business moves of their more forward-thinking competitors.

The beauty of VI Architecture is that businesses aren't forced to dismantle their existing infrastructure to take advantage of its benefits. SHV clusters can be deployed around a core business computing environment, to support the new applications and capabilities that the technology was designed to exploit. For a minimal cost, companies can position themselves at the leading edge of a technology that will assure them the competitive advantage of cost-effective access to business information.

## For More Information

For additional information on the VI Architecture specification, visit Intel on the Web at:  
[www.intel.com/procs/servers](http://www.intel.com/procs/servers).

